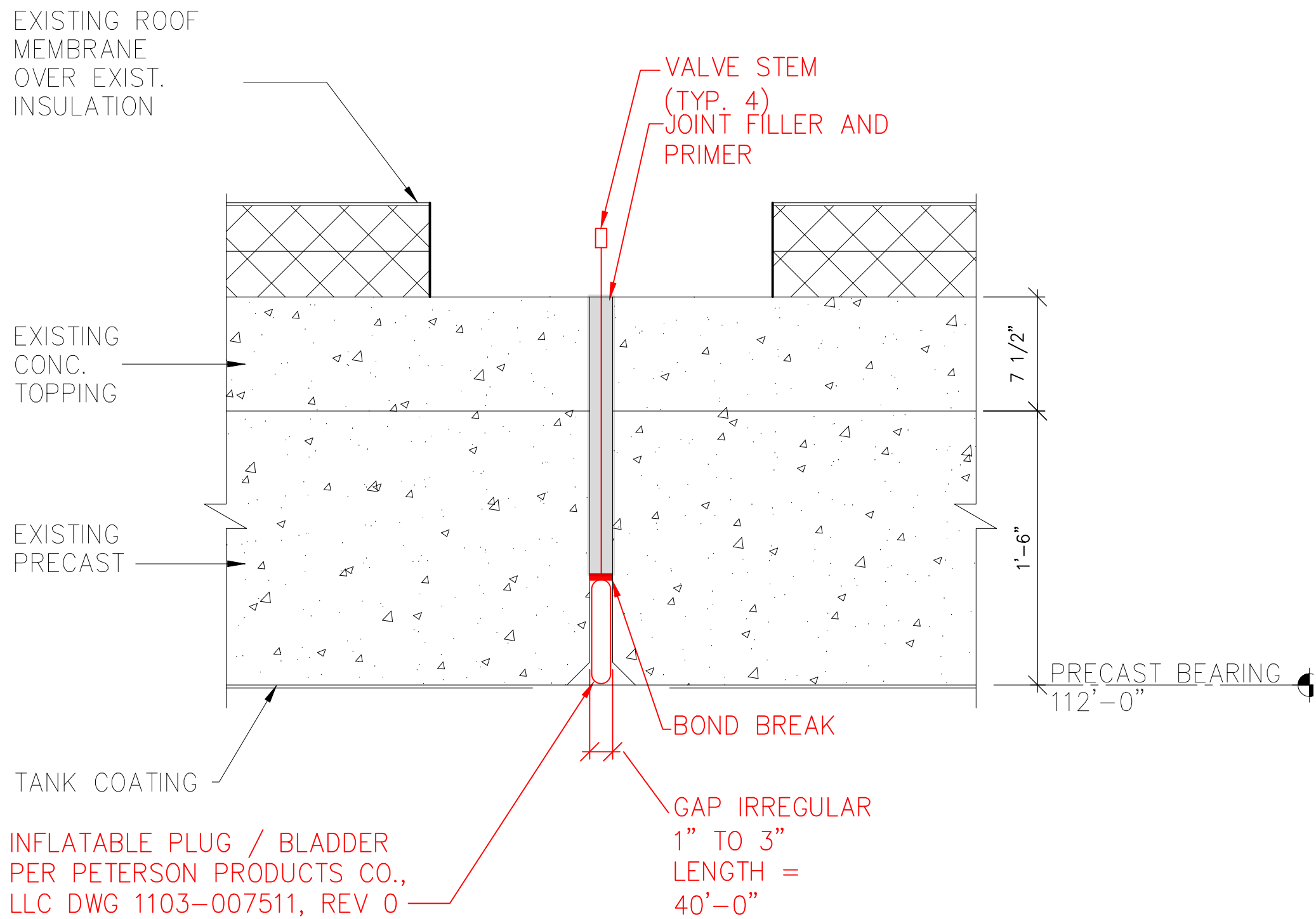


TANK ROOF FRAMING PLAN - AREA C

SCALE: 1/8" = 1'-0"



NOTES:

- REMOVE ROOFING AND INSULATION AT EXPANSION JOINT.
- INSERT CUSTOM INFLATABLE PLUG OR BLADDER. PLUG OR BLADDER MUST BE SUITABLE FOR USE IN AN ANAEROBIC DIGESTER ENVIRONMENT WITH AN OPERATING TEMPERATURE OF 90 TO 110 DEG. F. COMMON CONSTITUENTS IN BIOGAS:
  - METHANE - 50% TO 75%
  - CARBON DIOXIDE - 25% TO 50%
  - HYDROGEN SULFIDE - UP TO 10,000 PPMV
- BIOGAS PRESSURE UNDER PRECAST COVER CAN REACH 24 INCHES W.C.
- PROVIDE BULKHEAD EVERY 10-FT TO SPLIT PLUG OR BLADDER INTO 4 SECTIONS.
- PROVIDE CLOSED-CELL EXTRUDED POLYPROPYLENE BOND BREAKER BETWEEN BLADDER AND JOINT FILLER.
- POLYUREA JOINT FILLER:
  - CLEAN CONCRETE SURFACES OF CONTAMINANTS AND MOISTURE.
  - PRIME CONCRETE SURFACES WITH OAK RIDGE OR611 PRIMER.
  - FILL JOINT WITH OAK RIDGE OR80JF TWO-COMPONENT POLYUREA JOINT FILLER.
  - COMPLY WITH MANUFACTURER'S RECOMMENDATIONS

ROOF EXPANSION JOINT REPAIR GENERAL NOTES

- 5 NOVEMBER 2018 - MOBILIZE TO SITE, CONDUCT JHA, AND SET-UP/TEST SUPPLIED AIR EQUIPMENT (BY BOE) AND PPE.
- 6 NOVEMBER 2018 - CONDUCT DAILY SAFETY BRIEFING AND TASK PLANNING. DRAW DOWN DIGESTER #2 PRESSURE. LOCATE EXPANSION JOINT AND REMOVE EXISTING ROOF MEMBRANE AND INSULATION AS REQUIRED WITH NON-SPARKING TOOLS. EXCAVATE AND CLEAN JOINT WITH 20,000 PSI PRESSURE WASHER. JOINT FILLER'S MANUFACTURER REPRESENTATIVE TO REVIEW OPENING IS CLEAN ENOUGH FOR PRIMER. INSTALL INFLATABLE PLUG PER EXPANSION JOINT DETAIL INTO JOINT AND EXPAND SECTIONS WITH COMPRESSED AIR TO MANUFACTURER'S RECOMMENDED PRESSURE. CHECK FOR LEAKS WITH GAS DETECTION EQUIPMENT. SEAL LEAKS AS REQUIRED WITH OAKUM.
- 7 NOVEMBER 2018 - CONDUCT DAILY SAFETY BRIEFING AND TASK PLANNING. VERIFY PRESSURES IN INFLATABLE PLUGS. RE-CHECK FOR LEAKS WITH GAS DETECTION EQUIPMENT. SEAL LEAKS AS REQUIRED WITH OAKUM. ONCE SEALED, JOINT FILLER MANUFACTURER'S REPRESENTATIVE TO VERIFY SURFACES ARE SUITABLE FOR PRIMER. JOINT FILLER MANUFACTURER'S REPRESENTATIVE TO INSTALL PRIMER. AFTER PROPER CURING TIME, MANUFACTURER REPRESENTATIVE TO INTALL POLYUREA JOINT FILLER. SHAVE EXCESS MATERIAL FROM TOP OF SLAB WITH SHARP SCRAPER AFTER MATERIAL HAS SET FOR 30 MINUTES.

KEYPLAN - AREA C





EXPANSION JOINT REPAIR DETAILED WORK PLAN

- NOVEMBER 1
  - FULL BLOWN CLEAN AND TUNING OF THE FLARE.
  - INCLUDES PREVENTATIVE MAINT AS RECOMMENDED BY THE MANUFACTURER AND OPERATIONAL PERFORMANCE TESTING ON COMPONENTS (VALVES, SENSORS, LOUVERS, ETC).
- NOVEMBER 3
  - TAKE DELIVERY, FINISH TESTING, AND INSPECTION OF INFLATABLE BLADDERS FROM MANUFACTURER. VERIFY COMPLIANCE WITH SPECIFICATIONS.
- NOVEMBER 5
  - TRAVEL DAY FOR ALL (BIG OX, MM WATERJET, AND SPECTRUM). CONTACT SSC FIRE DEPARTMENT AND INVITE THEM TO STANDBY ON TUESDAY.
- NOVEMBER 5 LATE DAY
  - ARRIVE ON SITE AND DROP OFF EQUIPMENT. PLAN FOR THE NEXT DAY
  - SETUP AIR TRAILER, AND WATER JET PUMP TRAILER. STAGE SAFETY EQUIPMENT.
  - CONDUCT SAFETY TRAINING WITH ALL CONTRACTORS
- NOVEMBER 6
  - 7 AM
    - CONDUCT A SAFETY MEETING ON SITE WITH TED SOMMER FROM BIG OX ENERGY. SAFETY MEETING TO INCLUDE ENTIRE PLANT STAFF (AWARENESS, EMERGENCY PROCEDURES, EVAC/SHUTDOWN).
    - START FLARE AND SHUT DOWN GAS CLEAN UP SKID AND SET UP ALL SAFETY DEVICES.
      - FOLLOW NORMAL SOP FOR GAS SKID SHUT DOWN.
      - PERFORM FLARE ADJUSTMENT AND SET PRESSURE TO 2" WC.
      - MONITOR DIGESTER PRESSURE AND VERIFY PRESSURE REACHES SET POINT (2").
      - MANIPULATE PRESSURE TO SIMULATE PRESSURE CHANGES AND ASSURE PROPER RESPONSIVENESS OF FLARE; ATTEMPT TO CREATE FAULT TO ASSURE PROPER FLARE OPERATION.
      - IN THE EVENT OF COMPLETE FLARE FAILURE DURING TESTING, WORK WILL BE SUSPENDED AND FAILURE WILL BE REMEDIED.
      - IN THE EVENT OF COMPLETE FLARE FAILURE DURING WORK, GAS SKID WILL BE MOVED FROM STANDBY TO FULL OPERATION TO PROCESS GAS. SKID IS CAPABLE OF MAINTAINING 5" WC OR LESS).
  - CONTACT SSC FIRE DEPARTMENT TO UPDATE PROGRESS.
  - MOBILIZE WATER JET EQUIPMENT TO ROOF.
  - SET UP ANTICIPATED HOT ZONE.
  - STAGE SUPPLIED AIR RESPIRATORS, PROTECTIVE SUITS, GLOVES, ETC.
    - ENSURE 100% MONITORING OF FLARE & GAS SKID.
    - VERIFY PROPER OPERATION OF ALL AREA MONITORING EQUIPMENT
- NOVEMBER 6 (CON'T)
  - 8AM
    - MM WATERJET START BLOWING OUT JOINT (ESTIMATED 5 HOURS) THE REST OF THE TEAM SUPPLY SUPPORT AND CLEAN UP.
    - TWO STANDBY PERSONNEL IN PPE AND RESPIRATORS IMMEDIATELY OUTSIDE THE HOT ZONE.
    - START WITH SOUTH END OF THE JOINT AND WORK TOWARDS THE NORTH TO PUSH ANY DEBRIS INTO CONTAINMENT AREA.
    - WATER JET EQUIPMENT SHALL BE INTRINSICALLY SAFE (NON-RATED PUMP AND HEAT IS ON TRAILER, OUTSIDE OF SAFETY ZONE).
    - SEE SAFETY PLAN FOR OTHER CONTROLS.
  - 1PM
    - FINISH WATER BLASTING AND CLEAN UP DEBRIS.
    - INSPECT QUALITY OF JOINT SURFACES AND THOROUGHNESS OF CLEANING – USE RATED FLASHLIGHTS.
    - DEMOBILIZE MM WATERJET.
  - 2PM– 6PM
    - INSTALL THE INFLATABLE BLADDER AND PRESSURIZE USING NITROGEN WITH AN APPROPRIATELY SET REGULATOR TO ENSURE A MAXIMUM PRESSURE OF 5PSIG (BLADDERS ARE RATED TO 30PSIG).
    - FILLING WILL STOP WHEN BIOGAS IS EFFECTIVELY CONTAINED AND LEAKING STOPS
    - CHECK FOR LEAKS AND INSTALL OAKUM AS NEEDED TO STOP SMALL LEAKS.
      - VERIFY SEAL THROUGH BOTH VISUAL, TACTILE CHECK, AND GAS DETECTION CHECK.
      - ANY LEAKS TO BE SEALED WITH OAKUM AND A PROPERLY RATED SEALANT
    - A SECOND COMPLETE BLADDER IS ON HAND IN CASE OF FAILURE OF THE FIRST.
    - FOUR 2' BLADDERS ARE ON HAND FOR BACKUP IF NEEDED TO DOUBLE SEAL TROUBLE AREAS AS NEEDED
    - TEAM MEETING TO VERIFY ADHERENCE TO WORK PLAN AND ADDRESS ANY OBSERVED ISSUES.
      - DECISION POINT – EITHER ADJOURN FOR THE NIGHT (BASED ON WEATHER AND DAYLIGHT) OR CONTINUE WITH POLYUREA INJECTION.
      - EXTERIOR FLOOD LIGHTING IS ON STANDBY IN THE EVENT THAT WORK PROCEEDS PAST DUSK.
- NOVEMBER 7
  - 7AM
    - TOOL BOX TALK FOR THE DAY.
    - VERIFY CONTINUED PERFORMANCE OF BLADDERS; INSPECT; TEST FOR LEAKS.
  - 7:15AM –12PM
    - SPECTRUM TO MIX AND SPRAY/ INJECT THE POLYUREA AND LET CURE.
  - 1PM–3PM
    - MONITOR JOINT AND CHECK FOR LEAKS.
    - PERFORM VISUAL INSPECTION.
    - PERFORM SNIFFER TEST WITHIN 1" OF JOINT TO TEST FOR LEAKS OF: CH4, CO, CO2, H2S, O2
  - 4PM
    - START-UP GAS CLEAN UP SYSTEM, AND SHUT DOWN FLARE
    - RE-INSPECT; PERFORM SNIFFER TEST WITHIN 1" OF JOINT TO TEST FOR LEAKS OF: CH4, CO, CO2, H2S, O2.
    - DEMOBILIZE BOE AND SPECTRUM.
- DATE TO BE DETERMINED
  - ROOFING CONTRACTOR TO REPAIR FOAM INSULATION AND RUBBER ROOFING MEMBRANE (DOES NOT IMPACT INTEGRITY OF THE CONTROL JOINT).
  - SOFFIT REPAIR (AESTHETIC REPAIR).

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RENEWABLE NATURAL GAS FACILITY  
BIG OX ENERGY DAKOTA CITY NEBRASKA 68731  
EXPANSION JOINT REPAIR DETAILED WORK PLAN

DESIGNED PEB	DRAWN GVV
PROJECT NO. B1076-950158	
DATE 4-10-15	
SHEET NO.	

S209

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REVISION 1

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